# WHAT IS CLAIMED

1        1. A data flow classification system comprising:

2        a data flow managing mechanism configured to identify, track, and manage

3    said data flow;

4        a rule set including a plurality of rules for comparing information contained

5    in said data flow with pre-specified values;

6        a configurable classification rule engine for classifying said data flow into

7    one of a plurality of traffic classes based on results of said comparisons between said rules

8    and said pre-specified values;

9        a configuration file for configuring said classification rule engine and for

10    specifying said pre-specified values and information regarding at least one of said data

11    flow, said rule set, and said plurality of traffic classes,

12        wherein said configuration file comprises a format that allows for the

13    modification and reconfiguration of said classification rule engine, said data flow, said

14    rule set, and said plurality of traffic classes.


1        2. The system of Claim 1, wherein said data flow managing mechanism includes a

2    flow table mechanism configured to perform at least one of capturing said information

3    contained in said data flow, mapping a packet to a data flow, identifying said data flow

4    based on said captured information, registering active data flows, and deleting inactive

5    data flows.


1        3. The system of Claim 2, wherein said plurality of rules comprise a data structure

2    including,

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3          event indicia for indicating the invocation of one of said rules,

4          condition indicia for representing a comparison or condition between said

5 one of said rules and said pre-specified values,  and

6          action indicia for indicating the execution of an action based on results of

7 said comparison.

1          4.  The system of Claim 3, wherein said action indicia includes information for at

2 least one of designating said data flow as one of said traffic classes and chaining to

3 another of said rules

1          5.  The system of Claim 4, wherein said classification engine classifies said data

2 flow into one of said traffic classes in accordance with a dynamic classification scheme.

1          6.  The system of Claim 5, wherein said data flow managing mechanism identifies

2 said data flow as a particular type of traffic.

1          7.  The system of Claim 6, further comprising a traffic monitoring mechanism

2 configured to monitor attributes of said data flow and to provide update information to

3 said data flow managing mechanism.

1          8.  The system of Claim 7, wherein said traffic monitoring mechanism comprises a

2 plurality of traffic monitors, each of said traffic monitors being capable of monitoring and

3 measuring at least one predetermined attribute of said data flow.

1          9.  The system of Claim 8, wherein said traffic monitors comprise a data structure

2 including,

3          identifier indicia for identifying a type of traffic monitor,  and

4          value indicia for indicating a value measured by said traffic monitor.

1          10.    The system of Claim 9, wherein classification engine comprises a data

2      structure including,

3              traffic type indicia indicating the traffic type of said data flow,

4              traffic class indicia representing the different classes of traffic

5      corresponding to the traffic type,

6              transition indicia indicating transitions from one of said traffic classes to

7      another of said traffic classes, and

8              rule indicia containing traffic monitor information, corresponding rule

9      information, said predefined values, and transition class information,

10             wherein said classification engine compares said traffic monitor

11     information to said rule and said predefined values to classify said data flow into a traffic

12     class corresponding to said traffic type.

1          11.  The system of Claim 4, wherein said classification engine classifies said data

2      flow into one of said traffic classes in accordance with a Layer-7 classification scheme.

1          12.    The system of Claim 11, wherein said classification engine selects a

2      predetermined packet from said data flow containing application information.

1          13.  The system of Claim 12, wherein said classification engine comprises a data

2      structure including,

3              information location indicia indicating the location where said application

4      information is contained within said predetermined packet,

5       character indicia defining the number of characters within said location

6   indicia to be compared, and

7       pattern indicia representing a pattern corresponding to a particular traffic

8   class.

1       14.  The system of Claim 13, wherein said classification engine compares

2   said pattern indicia to said character indicia to classify said data flow into said traffic class.

1       15.  A method of classifying a data flow, comprising:

2       identifying, tracking, and managing said data flow by a data flow managing

3   mechanism;

4       comparing information contained in said data flow with a plurality of rules

5   containing pre-specified values, said plurality of rules included in a rule set; and

6       classifying, by a configurable classification rule engine, said data flow into

7   one of a plurality of traffic classes based on results of said comparisons between said rules

8   and said pre-specified values;

9       wherein said classification rule engine is configured by a configuration file,

10  said configuration file specifying said pre-specified values and information regarding at

11  least one of said data flow, said rule set, and said plurality of traffic classes, and

12       wherein said configuration file comprises a format that allows for the

13  modification and reconfiguration of said classification rule engine, said data flow, said

14  rule set, and said plurality of traffic classes.

1       16.  The method of Claim 15, wherein said data flow managing mechanism

2   includes a flow table mechanism configured to perform at least one of capturing said

3   information contained in said data flow, mapping a packet to a data flow, identifying said

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4    data flow based on said captured information, registering active data flows, and deleting

5    inactive data flows.

1         17.   The method of Claim 16, wherein said plurality of rules comprise a data

2    structure including,

3              event indicia for indicating the invocation of one of said rules,

4              condition indicia for representing a comparison or condition between said

5    one of said rules and said pre-specified values,  and

6              action indicia for indicating the execution of an action based on results of

7    said comparison.

1         18.  The method of Claim 17, wherein said action indicia includes information for

2    at least one of designating said data flow as one of said traffic classes and chaining to

3    another of said rules.

1         19.  The method of Claim 18, wherein said classification engine classifies said data

2    flow into one of said traffic classes in accordance with a dynamic classification scheme.

1         20.   The method of Claim 19, wherein said data flow managing mechanism

2    identifies said data flow as a particular type of traffic.

1         21.  The method of Claim 20, further comprising a traffic monitoring mechanism

2    configured to monitor attributes of said data flow and to provide update information to

3    said data flow managing mechanism.

1    22.    The method of Claim 21, wherein said traffic monitoring mechanism

2    comprises a plurality of traffic monitors, each of said traffic monitors being capable of

3    monitoring and measuring at least one predetermined attribute of said data flow.

1    23.    The method of Claim 22, wherein said traffic monitors comprise a data

2    structure including,

3              identifier indicia for identifying a type of traffic monitor, and

4              value indicia for indicating a value measured by said traffic monitor.

1    24.    The method of Claim 23, wherein classification engine comprises a data

2    structure including,

3              traffic type indicia indicating the traffic type of said data flow,

4              traffic class indicia representing the different classes of traffic

5    corresponding to the traffic type,

6              transition indicia indicating transitions from one of said traffic classes to

7    another of said traffic classes, and

8              rule indicia containing traffic monitor information, corresponding rule

9    information, said predefined values, and transition class information,

10             wherein said classification engine compares said traffic monitor

11   information to said rule and said predefined values to classify said data flow into a traffic

12   class corresponding to said traffic type.

1    25.  The method of Claim 18, wherein said classification engine classifies said data

2    flow into one of said traffic classes in accordance with a Layer-7 classification scheme.

1      26.    The method of Claim 25, wherein said classification engine selects a

2    predetermined packet from said data flow containing application information.

1      27.   The method of Claim 26, wherein said classification engine comprises a data

2    structure including,

3          information location indicia indicating the location where said application

4    information is contained within said predetermined packet,

5          character indicia defining the number of characters within said location

6    indicia to be compared, and

7          pattern indicia representing a pattern corresponding to a particular traffic

8    class.

1      28.   The method of Claim 27, wherein said classification engine compares said

2    pattern indicia to said character indicia to classify said data flow into said traffic class.

1      29.   A machine-readable medium encoded with a plurality of processor-executable

2    instruction sequences for classifying a data flow, said instruction sequences comprising:

3          identifying, tracking, and managing said data flow by a data flow managing

4    mechanism;

5          comparing information contained in said data flow with a plurality of rules

6    containing pre-specified values, said plurality of rules included in a rule set; and

7          classifying, by a configurable classification rule engine, said data flow into

8    one of a plurality of traffic classes based on results of said comparisons between said rules

9    and said pre-specified values;

10      wherein said classification rule engine is configured by a configuration file,

11   said configuration file specifying said pre-specified values and information regarding at

12   least one of said data flow, said rule set, and said plurality of traffic classes, and

13      wherein said configuration file comprises a format that allows for the

14   modification and reconfiguration of said classification rule engine, said data flow, said

15   rule set, and said plurality of traffic classes.

1      30.   The machine-readable medium of Claim 29, wherein said data flow managing

2   mechanism includes a flow table mechanism configured to perform at least one of

3   capturing said information contained in said data flow, mapping a packet to a data flow,

4   identifying said data flow based on said captured information, registering active data

5   flows, and deleting inactive data flows.

1      31.   The machine-readable medium of Claim 30, wherein said plurality of rules

2   comprise a data structure including,

3      event indicia for indicating the invocation of one of said rules,

4      condition indicia for representing a comparison or condition between said

5   one of said rules and said pre-specified values, and

6      action indicia for indicating the execution of an action based on results of

7   said comparison.

1      32.   The machine-readable medium of Claim 31, wherein said action indicia

2   includes information for at least one of designating said data flow as one of said traffic

3   classes and chaining to another of said rules.

1    33.  The machine-readable medium of Claim 32, wherein said classification engine

2    classifies said data flow into one of said traffic classes in accordance with a dynamic

3    classification scheme.

1    34.  The machine-readable medium of Claim 33, wherein said data flow managing

2    mechanism identifies said data flow as a particular type of traffic.

1    35.  The machine-readable medium of Claim 34, further comprising a traffic

2    monitoring mechanism configured to monitor attributes of said data flow and to provide

3    update information to said data flow managing mechanism.

1    36.  The machine-readable medium of Claim 35, wherein said traffic monitoring

2    mechanism comprises a plurality of traffic monitors, each of said traffic monitors being

3    capable of monitoring and measuring at least one predetermined attribute of said data

4    flow.

1    37.  The machine-readable medium of Claim 36, wherein said traffic monitors

2    comprise a data structure including,

3          identifier indicia for identifying a type of traffic monitor, and

4          value indicia for indicating a value measured by said traffic monitor.

1    38.  The machine-readable medium of Claim 37, wherein classification engine

2    comprises a data structure including,

3          traffic type indicia indicating the traffic type of said data flow,

4          traffic class indicia representing the different classes of traffic

5    corresponding to the traffic type,

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6      transition indicia indicating transitions from one of said traffic classes to

7      another of said traffic classes, and

8      rule indicia containing traffic monitor information, corresponding rule

9      information, said predefined values, and transition class information,

10     wherein said classification engine compares said traffic monitor

11     information to said rule and said predefined values to classify said data flow into a traffic

12     class corresponding to said traffic type.

1      39. The machine-readable medium of Claim 32, wherein said classification engine

2      classifies said data flow into one of said traffic classes in accordance with a Layer-7

3      classification scheme.

1      40. The machine-readable medium of Claim 39, wherein said classification engine

2      selects a predetermined packet from said data flow containing application information.

1      41. The machine-readable medium of Claim 40, wherein said classification engine

2      comprises a data structure including,

3      information location indicia indicating the location where said application

4      information is contained within said predetermined packet,

5      character indicia defining the number of characters within said location

6      indicia to be compared, and

7      pattern indicia representing a pattern corresponding to a particular traffic

8      class.

1        42. The machine-readable medium of Claim 41, wherein said classification engine

2        compares said pattern indicia to said character indicia to classify said data flow into said

3        traffic class.